STUDY MATERIALS

Mine Manager/Examiner

DIESEL REGS

g) Standards for Diesel Engines in Underground Coal Mines.
The following rules govern the operation of diesel equipment in underground coal mines. In addition to these rules, compliance with 30 CFR 31, 32, and 36 (1983) as pertaining to the operation and maintenance of diesel equipment is required.

1)

A) Before operating any diesel equipment in an underground mine, the operator must submit to the Department of Mines and Minerals a mining plan amendment which shall contain a ventilation plan stating the quantity of air in the areas where the diesel equipment will be operating and the number of diesel units which the mine operator plans to operate. An operator must meet also the quantity of air requirements of Section 31.02 of the Coal Mining Act of 1953. This plan must also contain the projected quantities of diesel fuel to be used in a 24-hour period. The State Mine Inspector shall adjust the quantity of diesel fuel allowed in the mine in accordance with Sections (11) and (12) herein by submitting such adjustment in writing to the Department.

B) No diesel equipment shall be placed in initial operation

underground until it is checked for approval in accordance with Sections (2) and (10) herein and tested in accordance with Sections (3) and (4) herein by the State Mine Inspector for the district in which the mine is located. The State Mine Inspector shall submit to the Department, in writing, the mine operator's name, type of equipment, serial number and Mine Safety and Health Administration (MSHA) certification number.

C)

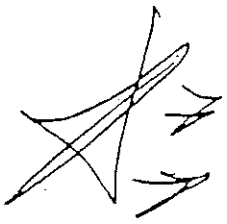
i) To amend a mining plan to include the use of diesel equipment in underground coal mines, an operator must submit a request for a mining plan amendment to the Mining Board. Upon receipt of that request, the State Mine Inspector shall test the mine in which the equipment is proposed to be used to insure that sufficient ventilation exists to comply with this rule.

ii) The State Mine Inspector shall test the diesel equipment which is proposed to be used in the mine prior to its installation for compliance with this rule. If this equipment meets the requirements of this rule, it shall be installed in the mine in which it is to be operated and tested again by the State Mine Inspector to insure it complies with the requirements of this rule. This equipment may not be operated until such time as its use is approved by the Mining Board.

iii) The State Mine Inspector shall provide a written report of the results of the testing of the equipment to the Mining Board. Within 10 days of receipt of the State Mine Inspector's report, the Mining Board shall approve or disapprove the operator's request. Within 10 days of such action, the Mining Board shall notify the operator of its decision. A denial of the operator's request shall be accompanied by a statement of reasons for the denial.

2) All diesel equipment operated inby the last open crosscut and in return air courses shall be permissible and shall be maintained and operated in a permissible condition as defined by 30 CFR 31 and 36 (1983). "Permissible", as used herein, shall mean diesel equipment which will not cause an underground ignition if an explosive mixture of gas is present and this piece of diesel equipment is operated in the presence of this explosive mixture of gas.

3) The quantity of ventilating air maintained in the last open



crosscut where multiple diesel units are operating in a working section shall be at least 100 percent of the air quantity specified on the approval plate of the first diesel unit (the unit requiring the highest air quantity on its approval plate), plus 75 percent of the approved plate air quantity of the second diesel unit (next highest air quantity), plus 50 percent of the approval plate air quantity of each additional diesel unit operating in that split of air.

4) Air quality in which diesel equipment is operated shall be sampled to determine if the composition of the air is within safe limits with respect to CO, NO, and NO2. These safe limits are currently defined as being equal to or less than the following values:

	TLV-TWA
Carbon Monoxide (CO)	50 ppm
Nitrogen Dioxide (NO2)	3 ppm
Nitric Oxide (NO)	35 ppm

(Reference: 30 CFR 75.301-2 MSHA and Threshold Limit Values for Chemical Substances in Work Air adopted by American Conference of Government and Industrial Hygienists, 1982)

5) Air quality measures for face equipment shall be taken in the operator compartment of the diesel equipment at a point where the air current exists the last open crosscut. Measurements must comply with Section (4) above.

6) Air quality measurements shall also be taken in the immediate return from each working section, while all units of diesel equipment being employed in that Section during the shift are operating. Measurements must comply with Section (4) above.

7) The measurements required in Sections (5) and (6) shall be made no less than twice a shift in mines and working sections employing diesel engines for the first time. After 500 hours of operating time has been accumulated in compliance with Sections (5), (6) and (7), the measurement frequency shall be reduced to once a week for the air quality measurements in the operator's compartment (Section (5)) and once per shift for air quality measurements in the immediate returns (Section (6)).

8)

A) Air quality measurement shall be taken by one of the following recognized methods:

i) gas concentration indicator tubes;
ii) vacuum bottle sample and subsequent analysis; or
iii) direct readout instruments which the Mine Safety and Health Administration has certified under 30 CFR

75.303-1, 75.303-2 (1985).

B) These testers shall be provided and maintained by the mine operators.

9) All tests shall be made by a competent person and the results of these tests shall be permanently recorded and kept in a place at the mine accessible to federal or state mine inspectors or officials, mine employees, or mine employee's representatives. These records shall be made available for inspection during the hours the mine's offices are open to the public. "Competent person" as used herein and in Section (14) below, shall mean a person trained by an instructor certified by MSHA under 30 CFR 48.3(h) (1985) or the Department to provide such training.

10) Air quality for outby diesel equipment shall meet the standards provided in 30 CFR 32 (1983) as that section pertains to mobile powered diesel equipment.

11) Diesel fuel storage and handling in a working section shall comply with the following:

A) Only one diesel fuel center will be allowed to be in permanent residence.

B) The diesel fuel center may be stored in combination with and/or in the same area as hydraulic oil, lubricating oil greases.

C) At least two approved ABC fire extinguishers will be available at the storage area.

D) The storage area shall be vented directly to the returns.

E) Storage shall be limited to a typical 24-hour supply for a given working section or not to exceed 500 gallons.

12) Diesel fuel storage for the mine shall comply with the following:

A) The underground storage area shall be vented directly to the returns.

B) At least two 150 lb. approved ABC type fire extinguishers and no less than 200 lbs. of rock dust shall be available at the underground mine storage area.

C) Storage underground shall be limited to a typical 24-hour supply for all normally operating diesel units in the mine.

13) All diesel engines, in particulr, their ihtake and exhaust systems, shall be maintained in accordance with the manufacturers specifications and instructions and in accordance with 30 CFR 31.4-31.5 (1985). Maintenance manuals shall be made available by the operator to the inspectors when requested.

14) Maintenance and inspection of diesel equipment will be conducted only by competent persons authorized by the mine operator (not to include State Mine Inspectors).

15) An approved ABC type fire extinguisher shall be carried at all times on each unit of diesel powered equipment.

16) No gasoline powered device will be allowed in an underground coal mine.

(Source: Amended at 10 Ill. Reg. 8104, effective June 15, 1986)

1. Know the Duties of a Mine Examiner or Mine Manager.
2. Memorize the Gas Chart.
3. Know how to Ventilate properly a Mine Map.
4. Know the Hoisting Signals and where shall they be displayed.
5. Be able to determine the Quantity of Air or Methane in an airway.
6. Be able to estimate the Quantity of Air to be added to reduce the percentage of Methane in any given percent or safe level.
7. Know how to determine the areas of a rectangular airway, a trapazoi square airway or a circular airway.
8. Be able to name correctly the Six Fundamental Ventalation Formulas and which three are most frequently used in ventilation calculation
9. What does the Coal Mining Law require as to Fire Prevention and Fire Control?
10. The Laws in reference to Storage and Handling of Explosives, Underground.
11. Define the terms: Mine, Mine Manager, Mine Examiner or Operator.
12. What are the Legal Requirements for Certification of Mine Examiner or Mine Manager?
13. How can a Certificate be revoked, cancelled or suspended and what steps are necessary in order to regain such certificate?
14. What are the major causes of Mine Fires and how to proceed to guard against them?
15. What are the major causes of Mine Explosions and how do you proceed to guard against them?
16. What is meant by "Splitting the Air Current, and what are its advantages? (Name five advantages of splitting the air current.)
17. Name the six main parts of a Dreager Apparatus and briefly explain each.
18. What are the requirements of the Law in regards to Coal Dust accumulations?
19. What are the requirements in regards to Rock Dusting? The distribution of rock dust and to what extent, the incombustibility the amount to be increased when what percent of methane is found?
20. What are the Ten major causes of Conveyor Belt Fires?
21. Name the major Flame Safety Lamp assemblies, and name at least eight parts.
22. Name Six requirements pertaining to the Main Ventilating Fan as to comply with the Coal Mining Act.
23. What are the Five Principal Objectives of First Aid?
24. What are the Six Fundamentals of First Aid?
25. What is First Aid?
26. What are the symptoms of Electrical Shock? (Name four symptoms)
27. What must be done first when a person is found in contact with energized equipment?
28. Secondly, how should a person be removed with safety to yourself?
29. If a person is overcome by Carbon Monoxide, what steps are to be taken in treating that person?
30. Name the four types of wounds and which is the most serious?
31. Name at least four reasons for giving a person Artificial Respira
32. Know the Self-Rescuer, what is it? what it protects you from? when should you put it on, when you should take it off and for ho long it will protect you from the dangerous gas.
33. Know how to use an Anemometer, what it measures, how the flow of air is recorded, Does it determine low velocities or high velocit
34. Name the five five different Damps often found in Coal Mines.
35. What is Water Gage? Anemometer? Hygrometer? Velometer? Thermometer? Smoke Tube? Barometer?

EXAMINER
EXPERIENCE AND DOCUMENTATION

CANDIDATES FOR MINE EXAMINER MUST:
DOCUMENT 4 YEARS EXPERIENCE (UNDERGROUND)
DOCUMENT 3 YEARS EXPERIENCE FOR ASSOCIATES DEGREE
DOCUMENT 2 YEARS EXPERIENCE FOR MINING ENGINEER DEGREE
BE 21 YEARS OLD
BE A U.S. CITIZEN
BE OF GOOD REPUTE AND TEMPERATE HABITS
DOCUMENT FIRST AID & MINE RESCUE TRAINING
PASS EXAMINATION
POSSESS FIRST CLASS PAPERS

DOCUMENTS NEEDED:
APPLICATION
LETTER OF EXPERIENCE FROM PRESENT OR PAST EMPLOYERS
2000-23 OR EQUIVALENT FOR FIRST AID & MINE RESCUE

TEMPORARY AVAILABLE IF:
EQUIVALENT OUT OF STATE CREDENTIALS DOCUMENTED
APPLICATION RECEIVED
PASS TEMPORARY EXAM
TEMPORARY VALID UNTIL NEXT AVAILABLE TESTING DATE

COURSE MATERIALS:
CLASSES AVAILABLE (NOT MANDATORY)
COAL MINING ACT & HEALTH & SAFETY REGS.
HANDOUTS FOR HOME STUDY (NOT RECOMMENDED ALONE)

MINE MANAGER
EXPERIENCE AND DOCUMENTATION

CANDIDATES FOR MINE MANAGER MUST:
POSSESS VALID MINE EXAMINERS PAPERS
BE 23 YEARS OLD
BE A U.S. CITIZEN
BE OF GOOD REPUTE AND TEMPERATE HABITS
PASS EXAMINATION

DOCUMENTS NEEDED:
APPLICATION
DOCUMENTATION OR VERIFICATION OF EXAMINERS PAPERS

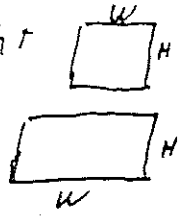
TEMPORARY AVAILABLE IF:
EQUIVALENT OUT OF STATE CREDENTIALS DOCUMENTED
APPLICATION RECEIVED
PASS TEMPORARY EXAM
TEMPORARY VALID UNTIL NEXT AVAILABLE TESTING DATE
NOTE: APPLICANT MAY BYPASS EXAMINERS PAPERS EXAM AND TEST FOR MINE MANAGERS IF OUT OF STATE EQUIVALENT IS DOCUMENTED

COURSE MATERIALS:
CLASSES AVAILABLE (NOT MANDATORY)
COAL MINING ACT & HEALTH & SAFETY REGS.
HANDOUTS FOR HOME STUDY (NOT RECOMMENDED ALONE)

AREA formulas = AREA ALWAY in SQUARE feet (sq ft)

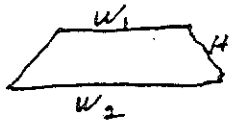
= Width x Height

$A = WH$



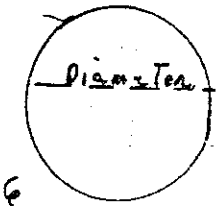
Formula for SQUARE or REPTANGLE

$\frac{(W_1 + W_2)(H)}{2}$



Formula for TRAPAZOID

$= 55 R^2$



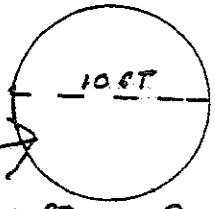
Formula for circle

55 = pie = 3.1416

R = Radias = ½ Diameter

R^2 = Radias squared = Radias X itself

Example:



AREA for circle

10 FT = Diameter

5 FT = Radias

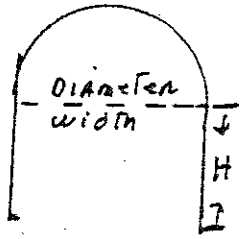
$5 \times 5 = R^2$

$25 = R^2$

$A = 3.1416 \times 25$

$A = 78.54$ sq ft

$= \frac{55 R^2}{2} + WH$

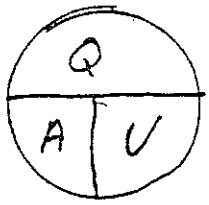


Formula for Arched AIRWAY

Figure AREA of circle
Divid by 2. This gives you
½ the circle (The ARch of Th
AIRWAY.

maltiply WidTh x HeighT (WH)
This gives you The AREa of
the SQUARE or REPTangle of The
BoTTom of Th ARched AIRWAY

minute (CFM)

$Q = A V$ OR 

Q = Quanity Recorded in CFM - cubic feet

A = Area Recorded in Sq ft - square feet

V = Velocity Recorded in fpm - feet per minute

Velocity is the anemometer reading

Find the approaite number put it in place of A letter & solve

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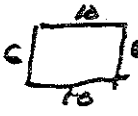
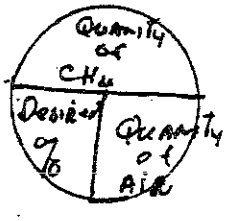
Perimeter & Rubbing Surface - linear feet

Perimeter = the sum of all the sides Example: 

perimeter = 6+6+10+10=

Rubbing Surface = Perimeter X length of the entry

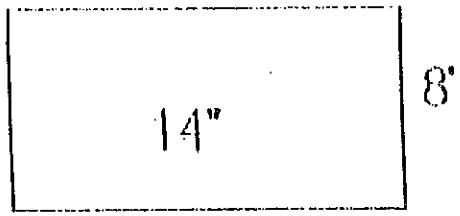
Dilution of Methane (CH_4)



Quanity of CH_4 = Spotter Reading % X Quanity of Air

Always remember to use % sign on calculator or change % to decimal

Plug in number in correct spots & solve

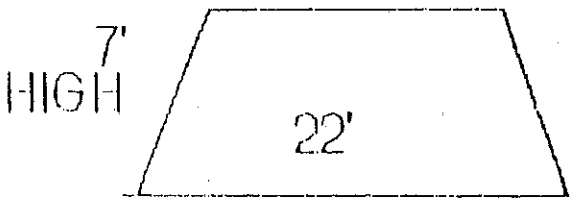
1. 

What is the area of this reclangular airway?

Formula for area - A= W x H

A = 14' x 8'

A = 112 sq. ft.

2. 

What is the area of this trapazoid entry?

Formula for area : top width + bottom width divide answer by 2

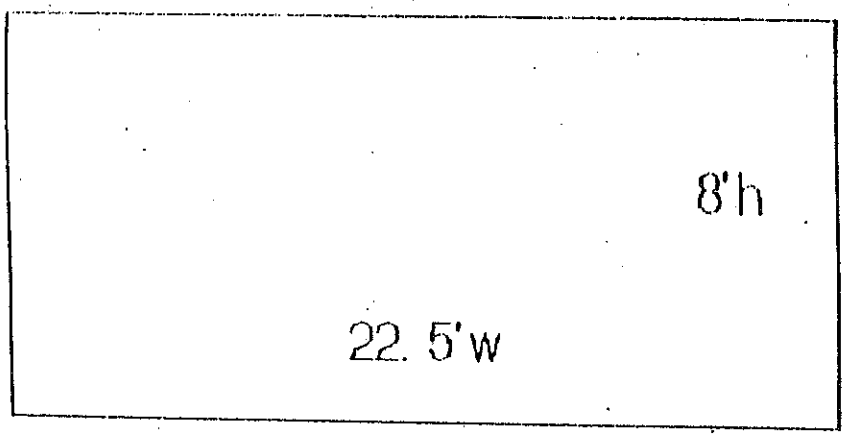
This gives an average width

now multiply the average width times the height.

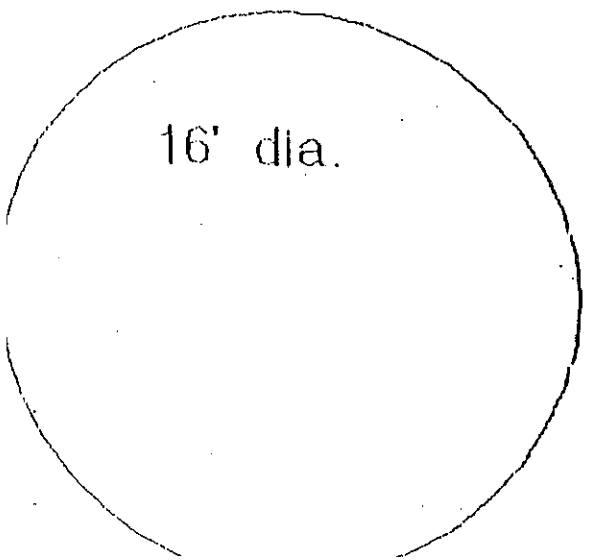
Step 1. - 18' + 22" = 40'

Step 2. -40'divided by 2 = 20'

Step 3 20'x 7'=140sq ft

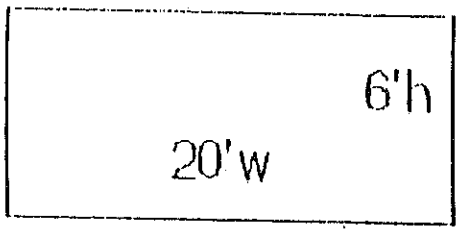


velocity is 135 fpm.
spotter reads 1. 4% Ch4.
How much air is needed
to reduce the Ch4 to . 5%?



what is the Area of this cir. shaft?
The velocity is 260 fpm.
What is the Quantity of air?

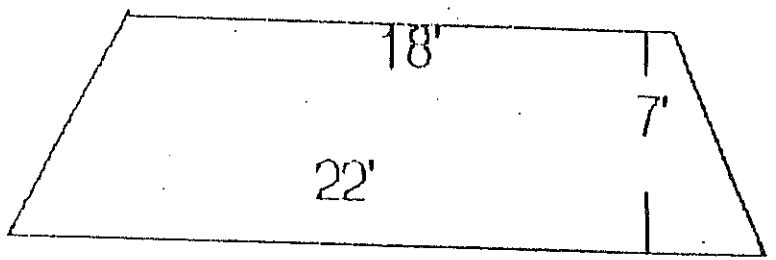
Your spotter shows . 8% of Ch4.
How much Ch4 passes this opening in 24 hrs?



What is Area of this rectangular airway?

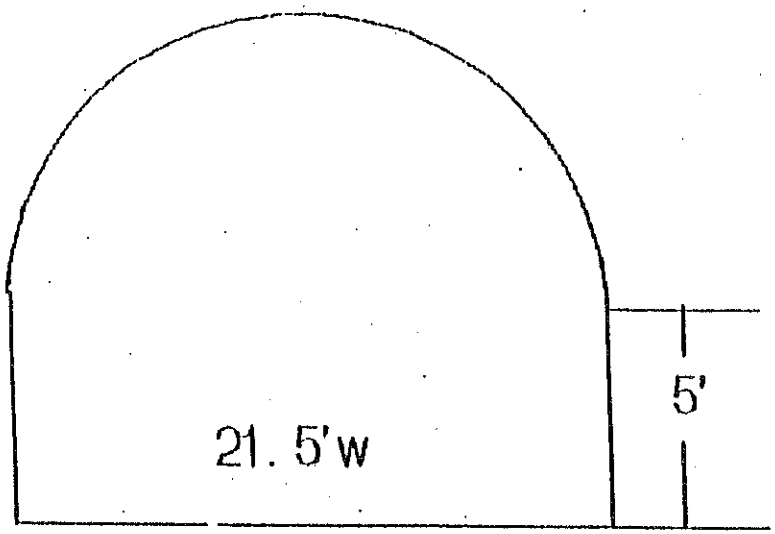
The annemometer reads 165 fpm.
What is the total Quantity of air?

The methane measured in the entry is at .6%.
What is the cfm of Ch4 in the entry?



What is the area of this entry?
The velocity is 90 fpm.
What is the quantity of air?

The methane content measures .6%.
What is the cfm of Ch4 in the entry?



What is the area?
Velocity is 140 fpm.
What is total Quantity?

Spotter reads 1.6% of Ch4.
How much Ch4 is liberated in a 24 hr period?

How much air must be added to reduce Ch4 to .8%?

BONUS QUESTION
NOW HOW MUCH CH4 IS LIBERATED IN 24 HR. PERIOD?

MINE EXAMINERS QUESTIONS

1. In a mine employing 50 men, the mine manager can act in the capacity of mine examiner while acting as mine manager. T F

2. If an examiner shall find dangerous roof or an accumulation of gas or other conditions he shall first report it to the mine manager. T F

3. When the immediate services of a certified mine examiner are not available a temporary mine examiner may be employed for a period not exceeding:
   a. 23 days
   b. 30 days
   c. 7 days

4. A mine examiner must be a citizen of Illinois. T F

5. A certified mine examiner shall be required at most of the coal mines. T F.

6. On a non-coal producing shift, the examiner doesn't have to make the mine in it's entirety if men are only working in the shaft, slope, drift or in the immediate shaft bottom. T F

7. In a non-gassy mine the examiner shall make a pre-shift examination on all three shifts. T F

8. A mine examiner must be at least:
   a. 22 years of age b. 30 years of age
   c. 21 years of age d. 20 years of age w/mining degree

9. An examiner who has his papers revoked or canceled shall be notified in writing _____days before any hearing on charges is set.
   a. 10 days b. 7 days
   c. 15 days d. 25 days

10. A person who has graduated and holds a two year degree in coal mining technology requires _____years to acquire examiners papers.
    a. 2 years experience b. 3 years experience
    c. 4 years experience d. 1 year experience

11. The pre-shift examination begins _____ before the oncoming shift.
    a. 2 hours b. 3 hours
    c. 4 hours d. 1 hour

12. On non-coal producing shifts the examiner need only examine
    a. the area surrounding the bottom area
    b. the entire mine
    c. only the shaft or slope
    d. need only to make a partial examination

13. Persons seeking certification as a mine examiner must have both first aid and mine rescue training. T F

14. A Mine Examiner should first "Danger Out" (tag) any area where Ch4 is found. T F

MINE MANAGERS QUESTIONS

1. A mine manager mut be at least
   a. 24 years old b. 23 years old
   c. 21 years old d. 25 years old

2. If a mine managers certification is canceled or revoked he will be notified _____days before any hearing on charges against him are set.
   a. 10 days b. 7 days c. 15 days d. 30 days

3. The mine manager or his assistant shall visit each working place in the mine
   a. twice a week b. once a week
   c. once every two weeks d. once each month

4. The mine manager or his assistant shall examine the escape shaft and roadways leading there
   a. twice a week b. once a week
   c. once every two weeks d. once each calendar day

5. The Mine manager shall or shall have the air measured at the inlet and outlet
   a. once a week b. each day c. each shift d. once a month

6. The mine manager is responsible for all hoisting equipment. T F

7. The mine manager determines the number of persons who ride the cage. T F

8. The mine manager, not the superintendent, is responsible for a mine check-in/ check-out system. T F

9. A mine manager may examine (as a mine examiner) at any time. T F

10. It is lawful to operate any underground mine without a mine manager. T F

11. A mine manager may leave at quitting time at any mine. T F

CAGES (art. 16)

1. T. F. Cages must be inspected at least once every 24 hours.

2. T. F. The speed of the cage may be changed from 500 fpm by the State Mine Inspector.

3. T. F. It is legal to carry tools while the cage is in motion under some circumstances.

4. T. F. If a hoist rope is attached by a poured socket method, the rope rope must be resocketed every year.

5. T. F. The proper size of the hoist rope is a standard that is established by the AMERICAN STANDARDS BOARD.

6. T. F. A hoist rope must be replaced when there are more than 6 broken wires discovered at any location on the rope.

7. T. F. 5 rings or whistles shall signify, DANGER.

8. T. F. 2 rings or whistles shall signify, LOWER CAGE (this signal is from top to bottom.)

9. T. F. The number of persons riding a cage in determined by the cage manufacturer.

10. T. F. 4 rings or whistles shall signify, ACCIDENT.

MISCELLANEOUS (art 13) CROSSCUTS and STOPPINGS (art 17)

1. Room necks may be advanced _____feet past new crosscuts.
   a. 10 ft. b. 15 ft. c. 20 ft. d. 25 ft.

2. Crosscuts shall not be more than _____ feet apart without permission of the state mining board.
   a. 50 ft. b. 60 ft. c. 80 ft. d. 100 ft.

3. Permanent stoppings must be erected within_____ feet of the face of the Main and cross entries at all times.
   a. 200 ft. b. 300 ft. c. 400 ft. d. 500 ft. e. 600 ft.

4. Permanent Stoppings must be made out of non-combustible materials. T F

5. Temporary stoppings may be used in room and sub-entries. T F

6. No person can cross a danger tag. T F

7. No more than two (2) persons can ride on a cage with a loaded or an empty Mine car. T F

8. The state mine inspector has the authority to enforce each mine's roof control plan. T F

9. Permissible motors are not required on air compressors located underground in non-gassy mines. T F

10. How far can you advance a face before a crosscut is opened up?
    a. 20 feet b. 15 feet c. legal cut d. any of above

11. All bath houses shall provide at least how many square feet of floor space for each employee?
    a. 15 sq. ft. b. 20 sq. ft. c. 10 sq. ft.

12. Before you abandon a place, a crosscut should be provided as near the face or room where practicable. T F

13. Any person who violates any provision of Article 13 of the Coal Mining Act is guilty of a Class A misdemeanor. T F

14. The first crosscut between all rooms off any entry shall not be more than _____ feet from the rib of the entry.
    a. 40 ft. b. 50 ft. c. 60 ft. d. 70 ft.

15. Any person desiring to test some new method or plan of mining coal that proposes to drive entries without crosscuts must first inform:
    a. State Mine Inspector b. The boss
    c. The Department of Mines & Minerals d. The company

16. A_____where practicable shall be provided at or near the face of each entry or room before the place is abandoned.
    a. air reading b. crosscut c. danger tag d. barricade

ELECTRICAL REGULATIONS (art. 18)

1. There must be at least_____fire extinguishers located at motor generation and transformer stations.
   a. 2 b. 3 c. 4 d. 1

2. _____ signs must be posted on all transformer stations high-voltage switchboards, and other installations.
   a. Keep out
   b. Danger - keep out
   c. Danger - High Voltage
   d. Absolutely no admittance

3. When track is used for a return conductor, rails are to be bonded _____
   a. every 500 feet
   b. not to exceed 100 feet
   c. at each joint
   d. at least within 1000 feet

4. All main power circuits entering the mine from the outside must have_____
   a. Disconnecting devices on the surface
   b. Disconnecting devices at the entrance to the underground
   c. Both a and b
   d. Need only a disconnect housed on the mine site

5. Casing of transformers shall be_____
   a. grounded
   b. made of non-conductive material
   c. be placed on non-conductive material
   d. all of the above

6. T. F. Rubber mats are the only acceptable material that may be used where a possible shock hazzard exists.

7. T. F. Along with fire extinguishers, rock dust or sand must also be present at motor generator and transformer stations.

8. T. F. Trolley wires or exposed electrical wires shall carry no more than 500 volts.

9. T. F. Trolley and feeder wires shall not extend beyond the last open crosscut.

10. T. F. Trolley and feeder wires shall be kept at least 250 feet from pillar workings.

ESCAPEMENTS (art. 19)

1. In mines employing more than 10 men, the distance between the mine shaft And the escapement shall not be less than
    a. 500 feet nor more than 1500 feet
    b. 500 feet nor more than 1000 feet
    c. 500 feet nor more than 2000 feet
    d. 250 feet nor more than 500 feet

2. If a slope being more than 45 degrees is a designated escape way it shall be equipped with
    a. a stairway
    b. handrails
    c. a walkway with cleats
    d. both b and c

3. Escapement passageways should be maintained to at least whenever possible.
    a. 5 feet high by 5 feet wide
    b. 4 feet high by 5 feet wide
    c. 6 feet high by 5 feet wide
    d. 5 feet high by 6 feet wide

4. One of the designated escape ways may be the return. True False

5. One of the escape ways must be the intake airway. True False

6. Platform landings are not required when a circular stairway is used in the escapement shaft. True False

7. In square or rect. shaft escapements a landing must be provided, this landing must be at least 4 feet wide and 4 feet long. True False

8. If a mine is equipped with a stairway in the main shaft, no stairway is required In the escapement shaft. True False

9. The escape shafts and roadway leading to them must be examined at least once in a 24 hour period. True False

EXPLOSIVES (art. 20)

1. Why has adobe or mud capping been made unlawful?
   a. The explosion would not be effective
   b. The unconfined explosion would raise dust which might become ignited
   c. Gas might become ignited
   d. The unconfined explosion might damage timbers and cause a fall of roof

2. What is considered a dangerous percentage of methane when permissible explosives are to be fired?
   a. .75 % b. 1.00% c. 1.50 % d. .50%

3. What kind of explosive should be used in a dry and dusty mine?
   a. Black powder, not in excess of one and one-half pounds
   b. Pellet powder, not in excess of one and one-half pounds
   c. Permissible explosives or other permissible blasting methods
   d. Low strength dynamite, not in excess of one pound

4. What should be done before shots are fired in places adjacent to where men are working?
   a. Test for gas should be made
   b. Ample warning should be given and all persons should be in the clear
   c. The foreman should be notified
   d. The shot fireman should make certain that the cable is attached to the leg wire.

5. What is the danger of improper stemming?
   a. The danger of premature explosion
   b. The danger of a blown-out shot
   c. The danger of a misfire
   d. The danger of a fall of roof

6. What should be the minimum length of a shot firing cable?
   a. 200 feet
   b. 150 feet
   c. Long enough for the shot fireman to be in a safe place around the corner
   d. 80 feet

7. For what purpose are permissible explosives designed?
   a. For positive action where the ventilation is poor
   b. For safe use in gassy or dusty mines
   c. To secure the maximum amount of lump coal
   d. To provide for the shooting of the coal without disturbing the roof

8. Does the Department of Mines have any legal authority over who is employed as a shot firer?
   a. No, the superintendent is responsible
   b. Only when the mine is classified as gaseous
   c. Yes
   d. No

9. How long should a person remain away from the face when a misfire has occurred when blasting with detonators?
    a. At least 60 minutes
    b. At least 5 minutes
    c. Until the place has been inspected for gas
    d. At least 8 hours

10. How should explosives be carried into a mine?
    a. They should be carried in a separate car with the man-trip
    b. All explosives should be carried into the mine by the shot firer
    c. They should be carried separately from firing devices and enclosed in non-conducting boxes
    d. They should be carried in explosion-proof receptacles by the tram motor crew

11. How should explosives be stored?
    a. In cool, moist, incombustible magazines
    b. In warm, dry, insulated magazines
    c. In cool, dry, and well ventilated magazines
    d. In closely pack shipping cases on the section

12. What is a permissible explosive?
    a. One which does not liberate poisonous fumes
    b. One which has passed certain tests conducted by the Bureau of Mines
    c. One which will not fire in the presence of gas
    d. One which is safe to use under any condition

13. What is considered a dangerous amount of methane when permissible explosives are to be fired?
    a. Any amount that can be detected with a methane test
    b. One quarter of one percent is considered dangerous
    c. Any amount within the 5 to 15 percent explosive range
    d. There is no danger as permissible explosives are designed for gassy mines
    e. None of the above

14. Upon shooting a place, how long should you wait until you examine the place, roof, ribs, and explosive gas?
    a. Three weeks
    b. Ten (10) minutes
    c. Not any
    d. Long enough to let the smoke clear out

15. How many times should you yell "Fire in the hole" before touching off a shot?
    A. Two times
    B. Three times
    C. Six times
    D. Not necessary to yell at all

FIRE PREVENTION AND FIRE CONTROL (art. 21)

1. Supplies of rockdust, water lines and hose, water or chemical trucks, or fire extinguishers are suitable fire-fighting equipment. T F

2. Underground storage places for lubricating oil and grease in excess of _____ days shall be of fireproof construction.
   a) 2
   b) 3
   c) 4

3. Before welding, cutting and soldering with arc or flame underground, the area must be tested for:
   a) carbon monoxide
   b) carbon dioxide
   c) methane

4. All fire-fighting operations shall be under the direct supervision of the mine manager or his designated assistants. T F

_____

5. In all mines classified as grassy mines by the State Mine Inspector, it shall be compulsory to use electric lamps. T F

_____

REFUGE UNDERGROUND (art. 23)

1. Refuge places shall not be spaced more than
   a. 80 feet apart
   b. 60 feet apart
   c. 120 feet apart

2. A refuge located near the bottom area of the mine, must be approved by the
   a. State Mining Board
   b. The State Mine Inspector
   c. The Department of Mines

3. The refuge place located near the bottom area shall not be more than _____ feet from the shaft where men are hoisted.
   a. 600
   b. 500
   c. 400

4. Room necks and crosscuts are not to be used as refuge places. T F

ROCKDUST (Art. 24)

1. In mines where conditions will not allow coal dust propagation, rock dusting to within 40 feet of faces is not required. T F

2. In mines that are partially rock dusted, back entries do not have to be dusted either. T F

3. The law requires that coal dust must allayed at
   a. All dump points b. At any point coal is transferred c. At its source

4. The Minimum level of incombustible content of coal/rock dust is
   a. 85 % b. 60 % c. 65 %

5. The minimum level of incombustible content of coal/rock dust would be _____ % is 1.8 % of Methane were also present.
   a. 68 % b. 72 % c. 83 % d. NONE OF THE ABOVE

6. 70 % of all rock dust must pass through a
   a. 70 mesh sieve b. 20 mesh sieve
   c. 200 mesh sieve d. 500 mesh sieve

7. All rock dust must pass through a
   a. 70 mesh sieve b. 20 mesh sieve
   c. 200 mesh sieve d. 500 mesh sieve

8. Rock dust can contain no more than
   a. 5 % combustible material and .5 % free silica
   b. . 5 % combustible material and 5 % free silica
   c. 5 % free silica and 5 % combustible material

9. In mines where coal dust can be propagated, rock dusting is required to within _____ feet of all faces.
   a. 60 b. 20 c. 40 d. As close as possible, without going beyond supports

10. When Methane is found, in mines requiring rock dusting, the incombustible content of the mixture must be raised by increasing the incombustible content 1 % for each 1 % of Methane detected. T F

SHAFTS (art. 26)

1. Not more than persons shall be lowered or hoisted in or on a bucket in a shaft at one time.
   a) 4
   b) 5
   c) 6

2. Men may ride on loaded bucked being hoisted. T F

3. Drifts and slopes must be fireproof for a distance of _____ feet from the entrance.

   a) 200 feet
   b) 250 feet
   c) 300 feet

4. All blasts in shaft sinking shall be exploded by electric battery. T F

_____

5. All hoisting shafts, air shafts, and escapement shafts shall be of fireproof construction, and if poured concrete is used, it shall not be less than _____ in thickness.
   a) 4 inches
   b) 5 inches
   c) 6 inches

VENTILATION (art. 31)

1. T. F. The ventilating current to the underground workings must not contain less than 20 % oxygen, 5 % CO_2, and no harmful or noxious gases.

2. T. F. In a gassy mine, there must be at least 150 cfm per person employed.

3. T. F. The main fan must be inspected each shift.

4. T. F. Mines with multiple fan installations must have fans installed with automatic closing doors.

5. T. F. Fan houses must contain a pressure recording gauge.

6. The main fan must be offset at least _____ feet from the shaft.
   a. 25 feet
   b. 10 feet
   c. 15 feet
   d. 100 feet

7. A mine is classified gassy when a State Mine Inspector finds
   a. any amount of methane
   b. 1 % of methane
   c. .25 % of methane
   d. any of the above

8. The minimum amount of air reaching the last open crosscut is required to be at least
   a. 9000 fpm
   b. 6000 fpm
   c. both of the above
   d. none of the above

9. Normal atmospheric air contains
   a. 22 % oxygen, 80 % Nitrogen, and .2 % CO_2
   b. 21 % oxygen, 78 % Nitrogen, and .3 % CO_2
   c. 20. 93 % oxygen, 78.10% Nitrogen, and .03 % CO_2
   d. 20.93 % O_2, 78 % N_2, and .03 % CO_2

10. The purpose in having either larger or more return entries than intake entries is
    a. To allow more means of escape
    b. To maintain high pressure in the returns and lower pressure in the intakes
    c. To maintain lower pressure in the returns and high pressure in the intakes
    d. None of the above

11. When the atmospheric pressure increases, methane will
    a. Likely increase
    b. Likely decrease
    c. Most likely stay the same

12. When the temperature increases, methane *Answer a PMM pg. 38*
    a. will increase
    b. will decrease
    c. will not be effected
    d. will actually vary in specific gravity

13. The main current of air must be split or subdivided as to give pure air to every _____ men at work.
    a. 25 b. 50 c. 100 d. 150

14. During pillar recovery at any mine, when working places approach to within ____ __ feet of abandoned sealed works, boreholes shall be drilled a distance of at least _____ feet in advance of the face of such working place.
    a. 200/25 b. 100/20 c. 50/25 d. 50/20

15. If a mine should mine within ____ feet of an adjacent mine, boreholes must be drilled at least_____feet in advance of such working place.
    a. 200/25 b. 200/20 c. 50/20 d. 300/20

16. T. F. Should advance borehole drilling be required, and rib boreholes also be required, they must be drilled on a 45 degree angle, at least 25 feet deep and no more than 25 feet apart.

ARTICLE 31

1. All active underground working places in a mine shall be ventilated by a current of air containing not less than _____ of oxygen.
   a. 19.05 %
   b. 19.50 %
   c. 15.9 %

2. All active underground working places in a mine shall be ventilated by a current of air containing not more than_____of carbon dioxide.
   a. 0.5 %
   b. 5.0 %
   c. 0.05 %

3. In every mine the minimum quantity of air shall not be less than _____ for each person employed.
   a. 150 cfm
   b. 500 cfm
   c. 250 cfm

4. Ventilating fan shall be operated while men are underground. T F
   _____

5. Ventilating fans shall be inspected _____
   a. prior to each shift
   b. once a day
   c. once every seven days

MAPS AND SURVEYS (art. 33)

1. The map scale shall be no smaller than
   a. 500 feet to the inch
   b. 400 feet to the inch
   c. 300 feet to the inch
   d. any of the above is acceptable

2. The map must show a north point. T F

3. The rise and dip of the coal seam must be shown on a profile drawing.
   T F

4. The map must be submitted to the proper people within 90 days of its completion. T F

5. A copy of the map must be given to the State Mine Inspector, the County recorder, and the Bureau of Mine. T F

6. An extension of the map must be made once every 2 years. T F

7. When a mine has been transferred to new ownership, the title of such transfer must be sent to the Recorder within 90 days. T F

8. An operator maybe found guilty of a business offense, and fined if he does not submit a copy of the map within 90 days. T F

9. A copy of a final map must be delivered to the department within 120 days after the closing of the mine. T F

10. In some instances, it may become necessary to draw a separate map for surface buildings and structures. T F

11. The map must have certification of the mining engineer or surveyor making the map, ascertaining ins correctness. T F

AREA & QUANTITY

1. What is the area of a mine entry that is 5 feet high and 12 feet wide?

2. What is the area of a mine entry that is 7 feet high and 15 feet wide?

3. What is the area of a mine entry that is 7-1/2 feet high and 12-3/4 feet wide?

4. What is the area of a mine entry that is 7-3/4 feet high and 19-7/8 feet wide?

5. What is the quantity of air flowing thru an entry that is 6-3/4 feet high, 12 feet wide and the velocity of air equal to 80 fpm?

6. What is the quantity of air flowing thru an entry that is 7-1/1 feet high, 20.4 feet wide and a velocity of air equal to 200 fpm?

7. What is the quantity of air moving thru an entry 20 feet in diameter and an anemometer reading of 270 fpm?

8. Find the quantity of air moving thru an entry that is 11-3/4 feet wide at the top, 13-1/4 feet wide at the bottom, 7-1/2 feet high and an air velocity of 76 fpm?

9. What is the area of a mine entry that is 6 feet 3 inches high and 14 feet 9 inches wide?

10. What is the area of a circular air shaft that measures 18 feet diameter?

11. What is the quantity of air in an entry 24 feet wide and 5 feet 6 inches high with an anemometer reading of 160 fpm?

12. What is the quantity of air through a regulator 7 feet high and 4 feet wide and a velocity of 610 fpm?

MISCELLANEOUS

1. No coal shall be produced, nor shall any face equipment be operated, while there is an interruption in communication. T F

2. There must be at least 3 permissible lamps and 1 barometer at each mine. T F

3. The mine examiners shall take and record the barometer reading daily. T F

4. The two principles of roof bolting are the conventional and resin methods. T F

5. When timbering toward an area of poor roof conditions, the first row of timbers should be placed no closer to the bad top than within at least 1 row Of bolts under good top. T F

6. Water and gas may be a contributing factor to poor roof conditions. T F

7. You are more likely to find gas in mines where the roof conditions are good, rather than poor. T F

8. You are more likely to find gas in mines that are deep as opposed to those that are shallow. T F

9. A low barometer means that air pressure is light and seals will generally be releasing more methane. T F

10. The S.C.S.R. is required to last for a period of 2 hours. T F

11. The F.S.R. is required to last for a period of 45 minutes. T F

12. It is safe to fight small mine fires while wearing the F.S.R.. T F

13. Underground explosive magazines must be placed on the return side, at least 10 feet from roadways or trolley wires. T F

14. No more than a 4 day supply of explosives shall be stored underground. T F

15. A hygrometer measures the moisture content of the air. T F

16. A F.S.R. must will protect the wearer from 2 % CO. T F

17. The S.C.S.R. will protect the wearer from any harmful or noxious gas. T F

18. It is possible to have too much coal dust to have an explosion. T F

19. The amount of coal dust sufficient to propagate an explosion is any amount that may become suspended in air. T F

MINE INSTRUMENTS

WATER GAUGE

1. A water gauge is measured in
   a. water per square inch b. in inches of water
   c. In atmospheres d. in specific gravity

2. 1 inch of water gauge is equal to
   a. 14.7 psi b. 5.2 lbs. per sq. foot c. 5 psi d. 5.2 psi

3. A high water gauge will normally indicate
   a. Abnormal resistance b. A decrease in resistance
   c. Failure of the fan d. Both a and c

4. A water gauge indicates the
   a. Atmospheric pressure
   b. The atmospheric pressure in contrast to the temperature
   c. The mine ventilating pressure
   d. All of the above

ANNEMOMETER

1. The purpose of the brake on the annemometer is to
   a. Stop the vane movement
   b. Stop the dial movement
   c. Both of the above

2. An annemometer measures air in
   a. Feet per minute b. In lineal feet c. Feet per sec.

3. Air readings are generally taken for
   a. 1 min. b. 2 min. c. 30 sec. X 2 d. 2 min divided by 2

4. The air current must pass through the
   a. Back of the instrument
   b. The front of the instrument
   c. Front or back will both read correctly

Gas Chart	Methane	Carbon Monoxide	Hydrogen Sulphide	Carbon Dioxide	Nitrogen	Oxyg
Chemical Symbol	CH4	CO	H2S	CO2	N2	O2
Specific Gravity	.555	.967	1.191	1.529	.967	1.1(
Incidence in air (%) ^ Trace amounts only	*	*	*	.03	78.10	20.9
Is it combustible?	YES	YES	YES	NO	NO	N(
Does it support combustion?	NO	NO	NO	NO	NO	YE
Is it poisonous?	NO	YES	YES	NO	NO	N(
How is it detected?	Safety Lamp CH4 detector Chemical Analysis	CO Detector Chemical	H2S Detector Chemical Analysis	Chemical analysis Safety Lamp	Chemical analysis Safety Lamp	Chen anal Safety
Explosive Range (percentage in air)	5 to 15%	12.5 to 73%	4.3 to 46%	NONE	NONE	NO
Ignition temperature	1100 to 1380 deg.	1100 deg.	700 deg.	NONE	NONE	NO
Origin	'occluded in coal and clay veins: Decomposition of Vegetable matter in water	Incomplete Combustion Mine Fires: Explosions and Blasting	Rarely found: Old pipe lines in poorly ventilated places	Complete combustion : Small quantity found naturally in air.	Found naturally in air frees Nitrogen	Found in
What is its effect on life?	Causes death by suffocation if breathed in high concentrations: Effect passes off quickly in fresh air	.10% in air causes complete collapse. Excludes Oxygen from the blood	.07 causes death in one hour: Very poisonous: Destroys olfactory nerves. (Sense of smell)	Causes death by suffocation: Excludes Oxygen from the blood: Labored breathing.	Causes death by suffocation: Excludes Oxygen from the blood: Labored breathing.	Nece L

FIRST AID

1. Use of pressure points are the most reliable method of controlling bleeding.

   True False

2. A person who has been knocked unconscious should be treated as if s/he has a neck or back injury.

   True False

3. Any moderate or serious injury to a joint should be treated as if the joint were fractured.

   True False

4. A person who has an obstructed airway should be given four back blows.

   True False

5. Second degree burns should be treated with burn ointment and covered with a sterile dressing.

   True False

6. Psychological shock can make shock from loss of blood worse.

   True False

7. The _____ of an unconscious patient should be evaluated before first aid treatment is begun.

   1. Condition
   2. Name
   3. Airway
   4. None of the above

8. A sharp stabbing pain in the chest is not a sign of _____.

   1. Gall bladder attack
   2. Heart attack
   3. Indigestion
   4. None of the above

9. Anyone with first aid training can tell if a patient is _____.

   1. Diabetic
   2. Hypertensive
   3. Not breathing
   4. Faking

10. When splinting a suspected fracture of a joint you should _____.

    1. Gently straighten the extremity
    2. Splint the extremity in the position found
    3. Splint the extremity in the position of function
    4. None of the above

11. Patients with extensive burns should always be evaluated for _____.

    1. Excessive thirst
    2. Burns to the eyes
    3. Airway problems
    4. Neck injuries

12. Puncture wounds to the chest wall should _____.

    1. Make a sucking noise
    2. Be covered with a sterile dressing
    3. Be covered with an airtight seal
    4. Be covered with merthiolate to prevent infection

13. After a person is struck by a falling object s/he should _____.

    1. Be removed from the dangerous area
    2. Be asked questions about where he is
    3. Be evaluated for fractures
    4. None of the above

14. The most obvious sign of a skull fracture in an unconscious patient is _____.

    1. A lump on the head
    2. Teeth missing from the mouth
    3. Bleeding or fluid leaking from the ears and nose
    4. None of the above

15. A person who is in shock should be _____.

    1. Transported to the hospital as fast as possible
    2. Positioned with his feet elevated at least 12 inches
    3. Covered with a blanket
    4. All of the above
    5. None of the above

16. Maintenance of the patient's airway is always the first priority in first aid treatment.

    True False

17. Second degree burns can be life threatening.

    True False

18. Electrical shock is a form of physiological shock.

    True False

19. Giving an injured person fluids to drink will prevent her or him from going into shock.

True False

20. Severe bleeding is best controlled by _____.

1. Tourniquet
2. Direct pressure
3. Pressure points
4. Elevation

21. A person who has been exposed to a hot environment for a long period of time and who has been found unconscious with hot, dry skin is in _____.

1. Heat exhaustion
2. Heat stroke
3. Heat cramps
4. Prostration

22. A person who has been exposed to a very cold environment and has developed a suspected case of frostbite should _____.

1. Have snow rubbed on the affected area
2. Be immersed in warm water
3. Be transported to the hospital
4. Be sent home

23. Shivering is the first sign of a dangerous condition known as _____.

1. Hypotension
2. Frostbite
3. Hypothermia
4. Frostnip
5. None of the above

24. A person who is a known diabetic and who is acting strangely or as if they are drunk should be given _____.

1. Oxygen
2. Sugar
3. Water
4. Aspirin

25. When a person has a seizure the most important treatment is _____.

1. Move objects, like chairs or tables, away from the patient
2. Hold the patient down so they won't hurt themselves
3. Insert something into their mouth so they don't bite their tongue
4. Maintain their airway in case they choke on vomit
5. 1 and 4
6. 2 and 4
7. 2 and 3
8. None of the above